Sustainable Production: Design by Components methodology in order to obtain a tailored product

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Aims & Scope

General Aims:

ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING is an international and interdisciplinary journal which reports on scientific and technical contributions.

ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING publishes invited review papers covering the full spectrum of engineering. The reviews, both experimental and theoretical, provide general background information as well as a critical assessment on topics in a state of flux. We are primarily interested in those contributions which bring new insights, and papers will be selected on the basis of the importance of the new knowledge they provide.

Topical reviews in materials science and engineering, each including:

- *surveys of work accomplished to date*
- *current trends in research and applications*
- *future prospects.*

As an open-access journal ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering will serve the whole engineering research community, offering a stimulating combination of the following:

- *Research Papers - concise, high impact original research articles,*
- *Scientific Papers - concise, high impact original theoretical articles,*
- *Perspectives - commissioned commentaries highlighting the impact and wider implications of research appearing in the journal.*

ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING encourages the submission of comments on papers published particularly in our journal. The journal publishes articles focused on topics of current interest within the scope of the journal and coordinated by invited guest editors. Interested authors are invited to contact one of the Editors for further details.

Every year, in three issues, ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING publishes a series of reviews covering the most exciting and developing areas of engineering. Each issue contains papers reviewed by international researchers who are experts in their fields. The result is a journal that gives the scientists and engineers the opportunity to keep informed of all the current developments in their own, and related, areas of research, ensuring the new ideas across an increasingly the interdisciplinary field.

ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING exchange similar publications with similar institutions of our country and from abroad.

Audience:

Scientists and engineers with an interest in the respective interfaces of engineering fields, technology and materials, information processes, research in various industrial applications. It publishes articles of interest to researchers and engineers and to other scientists involved with materials phenomena and computational modeling.

About us:

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering is an international and interdisciplinary journal which reports on scientific and technical contributions and publishes invited review papers covering the full spectrum of engineering.

Every year, in four online issues (fascicules 1 - 4), ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering [e-ISSN: 2067-3809] publishes a series of reviews covering the most exciting and developing areas of engineering. Each issue contains papers reviewed by international researchers who are experts in their fields. The result is a journal that gives the scientists and engineers the opportunity to keep informed of all the current developments in their own, and related, areas of research, ensuring the new ideas across an increasingly the interdisciplinary field.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering has been published since 2008, as an online supplement of the ANNALS OF FACULTY ENGINEERING HUNEDOARA – INTERNATIONAL JOURNAL OF ENGINEERING.

Now, the ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering is a free-access, online, international and multidisciplinary publication of the Faculty of Engineering Hunedoara.

Coverage:

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering is a good opportunity for the researchers to exchange information and to present the results of their research activity. Scientists and engineers with an interest in the respective interfaces of engineering fields, technology and materials, information processes, research in various industrial applications are the target and audience of ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering. It publishes articles of interest to researchers and engineers and to other scientists involved with materials phenomena and computational modeling.

The journal's coverage will reflect the increasingly interdisciplinary nature of engineering, recognizing wide-ranging contributions to the development of methods, tools and evaluation strategies relevant to the field. Numerical modeling or simulation, as well as theoretical and experimental approaches to engineering will form the core of ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering's content, however approaches from a range of environmental science and economics are strongly encouraged.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering appear in four issues per year and is open to the reviews, papers, short communications and breakings news inserted as Scientific Events, in the field of engineering.

General Topics:

ENGINEERING
- MECHANICAL ENGINEERING
- METALLURGICAL ENGINEERING
- AGRICULTURAL ENGINEERING
- CONTROL ENGINEERING
- ELECTRICAL ENGINEERING
- CIVIL ENGINEERING
- BIOMEDICAL ENGINEERING
- TRANSPORT ENGINEERING

ECONOMICS
- AGRICULTURAL ECONOMICS
- DEVELOPMENT ECONOMICS
- ENVIRONMENTAL ECONOMICS
- INDUSTRIAL ORGANIZATION
- MATHEMATICAL ECONOMICS
- MONETARY ECONOMICS
- RESOURCE ECONOMICS
- TRANSPORT ECONOMICS
- GENERAL MANAGEMENT
- MANAGERIAL ECONOMICS
- LOGISTICS

COMPUTER AND INFORMATION SCIENCES
- COMPUTER SCIENCE
- INFORMATION SCIENCE

AGRICULTURE
- AGRICULTURAL & BIOLOGICAL ENGINEERING
- FOOD SCIENCE & ENGINEERING
- HORTICULTURE

CHEMISTRY
- ANALYTICAL CHEMISTRY
- INORGANIC CHEMISTRY
- MATERIALS SCIENCE & METALLOGRAPHY
- POLYMER CHEMISTRY
- SPECTROSCOPY
- THERMO-CHEMISTRY

EARTH SCIENCES
- GEODESY
- GEOLOGY
- HYDROLOGY
- SEISMOLOGY
- SOIL SCIENCE

ENVIRONMENTAL
- ENVIRONMENTAL CHEMISTRY
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- ENVIRONMENTAL SOIL SCIENCE
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BIOMECHANICS & BIOTECHNOLOGY
- BIOMECHANICS
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- BIOMATERIALS

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- APPLIED MATHEMATICS
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- FOUNDATIONS & METHODS

Invitation:

We are looking forward to a fruitful collaboration and we welcome you to publish in our ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering. You are invited to contribute review or research papers as well as opinion in the fields of science and technology including engineering. We accept contributions (full papers) in the fields of applied sciences and technology including all branches of engineering and management.

Submission of a paper implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis) that it is not under consideration for publication elsewhere. It is not accepted to submit materials which in any way violate copyrights of third persons or law rights. An author is fully responsible ethically and legally for breaking given conditions or misleading the Editor or the Publisher.

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Editorial & Advisory Board

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Review process & Editorial Policy

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering is dedicated to publishing material of the highest engineering interest, and to this end we have assembled a distinguished Editorial Board and Scientific Committee of academics, professors and researchers.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering publishes invited review papers covering the full spectrum of engineering. The reviews, both experimental and theoretical, provide general background information as well as a critical assessment on topics in a state of flux. We are primarily interested in those contributions which bring new insights, and papers will be selected on the basis of the importance of the new knowledge they provide.

The editorial policy of ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering is to serve its readership in two ways. Firstly, it provides a critical overview of the current issues in a well-defined area of immediate interest to materials scientists. Secondly, each review contains an extensive list of references thus providing an invaluable pointer to the primary research literature available on the topic. This policy is implemented by the Editorial Board which consists of outstanding scientists in their respective disciplines. The Board identifies the topics of interest and subsequently invites qualified authors. In order to ensure speedy publication, each material will be report to authors, separately, thought Report of the Scientific Committee. For an overview of recent dispatched issues, see the ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering issues.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering encourages the submission of comments on papers published particularly in our journal. The journal publishes articles focused on topics of current interest within the scope of the journal and coordinated by invited guest editors. Interested authors are invited to contact one of the Editors for further details.

The members of the Editorial Board may serve as reviewers. The reports of the referees and the Decision of the Editors regarding the publication will be sent to the corresponding authors.

The evaluated paper may be recommended for:

- *Acceptance without any changes – in that case the authors will be asked to send the paper electronically in the required .doc format according to authors' instructions;*
- *Acceptance with minor changes – if the authors follow the conditions imposed by referees the paper will be sent in the required .doc format;*
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- *Rejection – in that case the reasons for rejection will be transmitted to authors along with some suggestions for future improvements (if that will be considered necessary).*

The manuscript accepted for publication will be published in the next issue of ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering after the acceptance date.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering accept for publication unpublished manuscripts on the understanding that the same manuscript is not under simultaneous consideration of other journals. Publication of a part of the data as the abstract of conference proceedings is exempted.

All the authors and the corresponding author in particular take the responsibility to ensure that the text of the article does not contain portions copied from any other published material which amounts to plagiarism. We also request the authors to familiarize themselves with the good publication ethics principles before finalizing their manuscripts.

Manuscripts submitted (original articles, technical notes, brief communications and case studies) will be subject to peer review by the members of the Editorial Board or by qualified outside reviewers. Only papers of high scientific quality will be accepted for publication. Manuscripts are accepted for review only when they report unpublished work that is not being considered for publication elsewhere.

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The Editor and editorial board members do not receive any remuneration. These positions are voluntary.
We are very pleased to inform that our journal ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING is going to complete its four years of publication successfully. In a very short period it has acquired global presence and scholars from all over the world have taken it with great enthusiasm. We are extremely grateful and heartily acknowledge the kind of support and encouragement from you.
ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING is seeking qualified researchers as members of the editorial team. Like our other journals, ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING will serve as a great resource for researchers and students across the globe. We ask you to support this initiative by joining our editorial team. If you are interested in serving as a member of the editorial team, kindly send us your resume to redactie@fih.upt.ro.

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The Scientific Committee members and Reviewers do not receive any remuneration. These positions are voluntary.
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Tome V (Year 2012). FASCICULE 1 [January–March]. ISSN 2067-3809

Content of FASCICULE 1 [JANUARY–MARCH]

ABSTRACT: *Laws of the cutting process create the required shape and size components constitute the essence of the machining process. Removing material in the form of chips by cutting affects the accuracy of dimensions, geometric shapes and surface quality. Surface quality is a complex concept characterized the surface integrity. Surface integrity is a summary statement of the conditions of production of functional areas, technologies used and their effect on the properties of machined surface. Efforts to complete concept of quality of surface layer (surface integrity) is starting to take only in recent decades. It is based on the technological processes and their effect on the depth and distortion of the surface layer. The parameters value of surface quality of machine parts is to be found in the production technology itself, particularly in machining. The geometry of machined parts is different from the ideal geometry entered drawings. On the machined surface generated micro roughness. The force effects of cutting tool during operation, then the thin layer of the machined surface deforms. As a result of deformation and heating of the surface layer heat (heat- that is always accompanied by a machining process) are formed in this layer of tension and change and its physical and mechanical properties. The task of examining the surface integrity is to create new theories in light of current trends in technological practice, thus improving the functionality of the qualitative component surfaces.*

ABSTRACT: *In this research, we aimed at treating the pharmaceutical wastewater, applying two systems that combined: ozonation- nanofiltration. We investigated the effect of ozonation before the nanofiltration. Pharmaceutical wastewater were treated with ozone, and the effects of the ozonation time and the flow rate on the flux, the membrane fouling and the COD retention were measured. The fouling of the NF DL membrane was studied. We compared the observed permeate flux during filtration with conventional nanofiltration (no preozonation), and with hybrid ozonation–nanofiltration process. In the filtration tests with ozonation, the permeate fluxes and the removal of the organic compounds was higher than that seen without ozone pretreatment. These results demonstrate the effectiveness of the hybrid system compared to the conventional polishing configuration.*

ABSTRACT: *Shear wave velocity measurement using bender elements has become more widely adopted in determining the small strain shear modulus (G_o) of soil specimens in recent years. Apart from being a non-destructive and hence easily repeatable test on the same specimen, the adaptability of the bender element transducers for installation in existing test apparatus has also helped popularize the method. With a pair of bender elements, i.e. a transmitter and a receiver, and the assumption of a homogeneous and elastic medium, the shear waves' transmitter-to-receiver travel time is measured, hence giving the shear wave velocity (velocity = transmitter-receiver distance / travel time). Taken in the plane wave propagation context, G_o is conveniently computed as a multiplication of the specimen's bulk density and square of the velocity. Unfortunately simplicity of the test procedure does not extend to the actual characteristics of shear wave propagation through the specimen, which inadvertently affect the received signal for reliable arrival time interpretation. Various factors contribute to distort the received signals and mask the accurate identification of arrival time. These factors were individually examined in this study with unconfined specimens, which were prepared from cement-stabilized artificial kaolin clay. A pair of 80 mm high cylindrical specimens, with 76 mm and 100 mm diameter respectively, was subjected to the shear wave velocity measurements using bender elements. It was found that these influencing factors can be categorized under those of the input frequency, specimen geometry, near-field effects and attenuation of the sent waves. Discussions based on the signals analyzed are presented under each of these categories, and the effects on the shear wave arrival time were assessed. While no best method for identifying the arrival time could be ascertained, a conclusion not dissimilar with reports by other researchers in similar endeavors over the years, these insights can be useful and instructive to minimize uncertainties when using this convenient measuring tool.*

ABSTRACT: *Kinetics of the reaction between particulate stibnite and mixed Na_2S + NaOH solutions were studied. The effects of concentrations of Na_2S and NaOH, temperature, particle size and liquid-to-solid ratio were investigated. It was observed that the rate of leaching of stibnite: a) increased with an increase in both Na_2S and NaOH concentration (from 0.5 wt. % to 2.0 wt. %), and temperature (from 292 K to 327 K); b) reached its maximum at Na_2S:NaOH molar ratio equal to 1:2; c) decreased with an increase in particle size (from 0.04 mm to 0.5 mm) and L/S ratio (from 10 to 100). The results are presented in terms of the shrinking-particle model. Calculated values of the kinetic parameters indicate that the leaching process is controlled by the chemical reaction between Sb_2S_3 and Na_2S at the liquid/solid interface. Apparent activation energy is approximately 44 kJ mol^{-1} and the apparent reaction order for Na_2S varies from 1.4 to 1.7.*

ABSTRACT: *Enterprise Requirement Planning (ERP) softwares have many advantageous and disadvantageous properties. Most important advantage is that the software includes much information relating to the activity of the company. But disadvantage is that not easy to fit the standardized nonflexible software to the individual requirements and processes of the users and some special evaluations can not be prepared automatically. The paper introduces the conception of software to be developed for a company in frame of a research project. This software has two modules, the first is an evaluation module, and the second is a planning module. The planning module support the organization and optimization of transport loops which can result higher profit and lower operation costs for the company, lower specific transport cost for the customers and lower air pollution.*

ABSTRACT: *The Vehicle Routing Problem (VRP) has been widely study by different authors, often specialist from Operation Research and Logistic fields. However, in the real context of decision making, new variants of VRP are found. These variants also show peculiar conditions which require a new approach for the existing methods. According to literature there are two types of optimization methods for solving VRP, exact and approximate methods. Sometimes, decision makers are subject of uncertainty about which method (exact or approximate) should be used according with the problem dimension, and also their characteristics. For these reasons, this paper proposes Discriminant Analysis for solving uncertainly about which optimization methods can be used with high quality results, due to the results of Discriminant Analysis we introduce a modified Ant Algorithm for route planning in the repair of electrical breakdowns. The meta-heuristic performance has been compared with a Branch and Bound strategic. Computational results confirm the effectiveness of the algorithm proposed.*

ABSTRACT: *This article describes how to implement improved ETL process in Matlab environment. New architecture real time ETL process stills automated without human – database administrator interference, in cost of reduced accuracy rendered by level of trust. This method is constructed in Matlab environment, due to simple transformation and convert routines and functions. First we described ETL as a part of KDD, what is Real time ETL and problem how to achieve real – time in real world. In next part we present our improved near real time ETL model with new architecture containing equation for calculation the level of trust. And finally we shows how to use Matlab routines and toolkit for achieve simplicity in ETL phases.*

ABSTRACT: *The article presents rules for designing a device for fastening tools and machined parts to a CNC machine tool. Suggested tooling was used on machine tools already working in machining industry. Those machine tools can be elements of Flexible Production Systems. Presented solutions facilitate the application of CNC machine tools in low-volume and piece production. The cost and effect analysis, carried out after applying certain CNC machine re-setting time shortening methods, draws the attention to resolving the question of improving their reliability and efficiency by appropriate structural solutions for devices used in machining.*

ABSTRACT: *This paper examines queuing models, in particular the single-server queuing system. Queuing models assist firms achieve this objective. Queuing models may help firms reduce queues by helping determine what type of system best suits the business. The paper is theory based and uses steady-state equations and simulation to model queuing systems. In particular, the paper examines whether the robustness of steady-state equations and the change of parameters will have a significant effect on queuing models. The paper finds that system complexity does have an impact on the accuracy of the steady-state method results. It is also found that the use of this method is subject to use requirements.*

ABSTRACT: *Precision die forging can be defined as a production of drop forgings whose shape is not very different from the shape of source part at the optimization of production costs and times. This paper deals with precision die forging of gear wheels in closed dies. The process has been realized on one forming operation in heat from ring billet. In comparison with open die forging, costs for forged material have been evaluated. Material flow in die cavity and effective plastic strain of the designed forging process has been realized with the help of computer simulation.*

ABSTRACT: *A sustainable production needs a change in the design methodology. By applying both the approach of Design by Components and Systems Design, the focus of the project becomes the human being and no more the final product. In order to design for a "human being" it is important not to project for a "user" but for a "subject", which has strong links with its territory and with its typical culture. The result of this methodology is a tailored product: different Countries and Cultures will define different needs and thus different products. The "customised product" will replace the standard one.*

ABSTRACT: *TQM is the approach for improvement of competitiveness, efficiency and flexibility of the entire company. It is the necessary mode of planning, organizing and understanding of each activity, depending upon each individual at each level in the company. The paper presents experience in implementation of Standard series ISO 9000ff, 14000ff and 17000ff to TQM in the automobile service center. The research was conducted in the company that possesses ISO certificates. Presented was the possibility of TQM implementation in the company. TQM in service centers can be observed as an opportunity for fundamental improvement of business functions and processes within the service, with the purpose of providing services and improving business results.*

ABSTRACT: *The global increase of manufacturing activities and the need for sustainability calls for manufacturing strategies and technologies with reduced environmental impact. On the basis of industrial experiences and academic reviews, this paper presents an elaborated framework presenting drivers for life cycle considerations in product realization within the manufacturing engineering industry. The framework considers the total life cycle of the product and production system with the phases of material processing, production, usage and afterlife. For each phase the drivers for an increased life cycle perspective is reviewed by the categories of cost reduction, value increase and regulatory initiatives.*

ABSTRACT: *This paper deals with process management in the diagnostic science with usage of the Decision Support System (DSS). Unlike the other common processes, diagnostic processes have some specifics. The outputs of diagnostic process can be used again as inputs. These outputs are measured data as well as gained knowledge and experience. Hence we are focused on increase of efficiency of data evaluation, optimizing of diagnostic processes and acceleration of development of new materials. Decision Support Systems are defined as "interactive computer-based systems, which help decision makers utilize data and models to solve unstructured problems". Therefore DSSs can be advisable solution for diagnostic processes, which are primarily unstructured. Unstructured problems can be partially supported by standard computerized quantitative methods, but it is necessary to develop customized solutions. This solution may require certain expertise that can be provided by intelligent system. Intuition and judgment may play a large role in this type of decisions. In the scope of development and diagnostic of new materials, DSSs can be used for optimizing of diagnostic processes and reduction of development time following the anterior data, knowledge and experience. DSSs provide new possibilities in discovery of materials and combination of materials with exactly defined properties. In addition, they can reduce related costs.*

ABSTRACT: *Controlling visible ozone injury on conifer species were in locality Kopaonik – Serbia. The trials were set in accordance with methods PP 1/152 (2) (EPPO, 1997), the treatment plan was made according to a fully randomized block design. Phytotoxicity was estimated according to instructions of PP methods (1/135 (2). Intensity of injury was performed using standard statistical methods Towsend- Heuberger, the efficiency according to Abbott, analysis of variance to Duncan test and methods PP/181 (2). The differences of the disease intensity were evaluated by the analysis of variance and LSD-test. In locality Kopaonik ozone forecasts are made daily during the ozone forecast season.*

ABSTRACT: *In the paper optical measurements of geometrical features on crankshafts were presented. The requirements of contemporary customer are getting higher and higher. It is particularly visible in aviation and automotive industry. For truck manufacturers it means efficient work with no repairs for hundreds thousand kilometers. It means also more measurements in every batch and on each workpiece. In this project we investigated possibility of use optics for fast inspection of diameters, lengths and form deviations. It was necessary to prepare a measurement strategy and elaborate uncertainty evaluation.*

ABSTRACT: *Injection moulding is one of the most important processes of cyclic polymer and other materials processing. It enables the production of very complex parts, in one cycle. For successful injection moulding, injection moulding system is necessary. It consists of main elements: the mould, injection moulding machine and device for mould temperature regulation (tempering), and additional elements: dryers, robots etc. All of the mentioned elements consume significant amounts of energy. The paper presents the analysis of the possibilities of energy savings in injection moulding process, starting with moulded part geometry, in order to obtain more energy efficient process.*

ABSTRACT: *Robust product environmental evaluation has to consider the whole lifecycle, called "cradle to grave" analysis. This activity gives wide benefits if carried out in the early design phases. CAD-SLCA integrated systems are innovative eco-design tools usable during product design feature definition in order to support SLCA (Simplified Life Cycle Assessment) method application. The present work describes how the CAD-SLCA approach can be put in practice by considering the assessment of the complete product lifecycle and by using a new software tool which integrates data from different design supporting systems. Particular focus has been placed on the use phase and end of life treatment. An example shows the approach results.*

ABSTRACT: *A combined cutting and joining process of technical textiles should help to reduce the number of production steps. Additionally, resources needed and waste should be minimized by a combined process. Process development is supported by Finite Element (FE)-simulations keep the number of experiments as low as possible. ANSYS software has been chosen for process simulation and examples of polypropylene fibers cutting are presented. Depending on process characteristics one or two laser sources will be used for experiments. First experiments have been performed on polyamide, polyester and polypropylene woven and knitted fabrics. It is intended that energy consumption as well as resource-efficiency of the combined laser cutting and joining process will be optimized and compared to conventional processes. Increased efficiency simplified and reduced requirements on storage and logistics could be beneficial especially for small- and medium-sized enterprises (SME's) in Europe.*

ABSTRACT: *In order to assure that the software service levels required by the service consumer are met by the service provider, constant monitoring and verification of the software is required. We propose a new XML schema for defining service level parameters. In documents based on this schema we define parts of application to be monitored, which metric is going to be used and what are expected values. We present the DProf tool for constant monitoring of software performance. The system is implemented in Java, but, with minor modifications, it can be used for .NET applications.*

ABSTRACT: *The wider objective of student's internship is the achievement of better interaction between universities and enterprises for timely preparation of the university graduates for labour market. Within the frame of the Automotive Engineering course at Politecnico di Torino, the internship is considered to be an instrument to reduce the distance between the theoretical and methodological knowledge acquired during the academic carrier, and the applicative integrated and systematic knowledge which characterizes the industry. Internship represents an opportunity for the students of their temporary introduction into the industrial community, with the purpose of establishing a first contact with companies, and at the same time, carrying out a training period without the setting of a subordinate work. This paper is presenting the general information about the internship program at the Politecnico di Torino, its understanding, types, philosophy and objectives, benefits and correlation with academic credits, complete organizational structure and collaboration with industrial partner institutions. The applying procedure and activation of an internship, rights and obligations of the parties, and necessary documents relevant to student practice, are also described. Finally, a brief review of internship reports with final evaluation criteria of performed work, and internship evaluation questionnaire is given.*

ABSTRACT: *In today's process manufacturing environment, innovation is viewed as critical to sustainable growth and business profitability. While open innovation is regarded as the answer, the companies can effectively measure the return on R&D investment, have acceptable product success rates, achieve acceptable promotional effectiveness, or have visibility into their compliance risks or operational readiness for new product launches. While open innovation is an actual topic, capitalizing on the opportunity requires holistic strategy, not just increased collaboration. Companies must have repeatable, compliant and responsive business processes, global information infrastructure that provides a single source of the truth, alignment across departments and solutions that evolve without coding. With holistic strategy and supporting infrastructure, companies can consistently minimize the time to scale, improve product success rates and promotional effectiveness, and enjoy sustainable and profitable growth. With open innovation providing unlimited opportunities, the company should start to identify the best open innovation opportunity and deliver top and bottom line of the company's benefits. The companies must first focus on the needs of their customer, continually minimize time to scale, eliminate waste, drive out costs and improve. These are core concepts of a Lean strategy. This paper will describe how Lean concept with PLM business strategy can leverage Lean with integrated compliance, continual improvement and other PLM best practices to increase the return on R&D investments and provide sustainable and profitable growth for business processes mainly manufacturing processes. The purpose of this paper is to review PLM approach linked to Lean concepts in order to achieve sustainable and innovative business processes with sustainable and profitable growth.*

ABSTRACT: *The business is experiencing intense development of standardization in the first decade of the 21st century. So far developed dozens of standards / models and recommendations for management systems, which are now applied separately or integrated with one or more standardized management system. The basis for the development of standardization of business was a series of ISO 9000, which has now reached that stage IV of development. The basis for their development from the year 2000 are principal quality management, their eighth We can also say that they are - the principles of quality management have always been the basis for the development of other models and standardized management system, which in this work and investigated. Namely, to determine what is the relationship between them and the practice of IMS applications in the Serbian economy, which in this paper and in detail and illustrated.*

ABSTRACT: *A today trend in manufacturing is characterized by production broadening, innovation cycle shortening, and the products have new shape, material and functions. The production strategy focused to time need change from the traditional functional production structure to production by flexible manufacturing cells and lines. Production by automated manufacturing system (AMS) is a most important manufacturing philosophy in last years. Our main aim of project is building of laboratory, in which will be located flexible manufacturing system consisting of at least two production machines with NC control (milling machines, lathe). These machines will be linked with transport system and they will be served by industrial robots. Within this flexible manufacturing system will be also station for quality control with camera systems and rack warehouse. The design of manufacturing system is a part of production planning. The main determining factors for the manufacturing system design are: the product, the production volume, the used machines, the disposable manpower, the disposable infrastructure and the legislative frame for the specific cases.*

ABSTRACT: *In discussing continuation in two-dimensional elasticity it is necessary to use certain results concerning the boundary values of Cauchy integrals. The purpose of this paper is to use the value of Cauchy's Integrals to find the solution problems of two-dimensional elasticity. The solution of problems of two-dimensional elasticity by methods using the techniques of the complex variable theory requires the determination from the boundary conditions, of two unknown complex functions, holomorphic at all points in the region of the complex plane occupied by the elastic material. This technique provides a straightforward solution to problems in which a combination of any two of the stress or displacement. Components are known on the boundary. In addition the method may be applied to problems which can be solved by conformal transformation.*

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, Fascicule 1 [January-March] is a volume dedicated to THE 3rd INTERNATIONAL SCIENTIFIC CONFERENCE – MANAGEMENT OF TECHNOLOGY – STEP TO SUSTAINABLE PRODUCTION – MOTSP 2011, organized in Bol, Island Brac, CROATIA (8–10 June 2011). In this sense, ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, Fascicule 1 [January-March] includes nine scientific papers which was presented in the Conference's sections. The new current identification numbers of papers are #11 – 19, in the content list.
Also, ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, Fascicule 1 [January-March] includes three scientific papers presented in the sections of Conference on INDUSTRIAL SYSTEMS 2011 – IS '11, organized in Novi Sad, SERBIA (14 – 16 September 2011). The current identification numbers of papers are #20 – 22, in the content list.
ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, Fascicule 1 [January-March] includes, also, original papers submitted to the Editorial Board, directly by authors or by the regional collaborators of the Journal [papers #1-10, and 23-25].

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SUSTAINABLE PRODUCTION: DESIGN BY COMPONENTS METHODOLOGY IN ORDER TO OBTAIN A TAILORED PRODUCT

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ABSTRACT: *A sustainable production needs a change in the design methodology. By applying both the approach of Design by Components and Systems Design, the focus of the project becomes the human being and no more the final product. In order to design for a "human being" it is important not to project for a "user" but for a "subject", which has strong links with its territory and with its typical culture. The result of this methodology is a tailored product: different Countries and Cultures will define different needs and thus different products. The "customised product" will replace the standard one.*
KEYWORDS: *Sustainable design, components, tailored product, subject*

INTRODUCTION

A sustainable production needs a change in the design methodology.

One of the biggest century challenges is the creation of "sustainable communities": social, cultural and physical environments where we are able to follow our needs, without a restriction on future generations.

A sustainable community is based on cooperation with the Nature and its principles.

The survival of the human being depends on our capacity to understand the rules of the ecology and consequently to live according to the Nature.

According to the theory of living systems, each organism – animal, vegetal, microorganism or human being- is seen an integrated whole, a living system. Throughout the living world, we find systems nesting within other systems. Systems theory entails a new way of seeing the world and a new way of thinking, known as systemic thinking. [1]

Through the Design by Component and Systems Design methodologies, the concept of "system" is also extended to the product and its production process. Therefore a product could be considered as a component of a big system, and each component is itself formed by several other sub-components. [2]

In a system each component is linked with the others through several flows of material, energy and social links. The study of relationships concerns not only the relationships among the system's components, but also those between the system as a whole and the surrounding larger systems. Those relationships between the system and its environment are what we call by "context", namely the "territory" (Figure 1).

In order to find a solution for human needs of all contexts in the world, designers should project tailored products for people, which live in different territories, located in several Countries.

The aim of this paper is to describe cultures and features' relevance of each different Country, in order to underline the necessity of a design of a customized product, namely "tailored product", and defined ad hoc for each territory.

In order to define a tailored product, it is necessary that the industrial companies change their production approach, that it means going from a "linear" system, where each actor of the process takes care only to its personal success, to an advanced type of interconnections, defined by cooperation and relationships between parts.

The Systems Design methodology applied to the industrial field moves the production towards the metabolism principles of Nature, where all the waste – namely output - are considered as resources for the same or other systems.

Applying the systemic thinking point of view the designer is able to consider not only the final product, but also the context: the final result is a more responsible product, deeply related with the local territory.

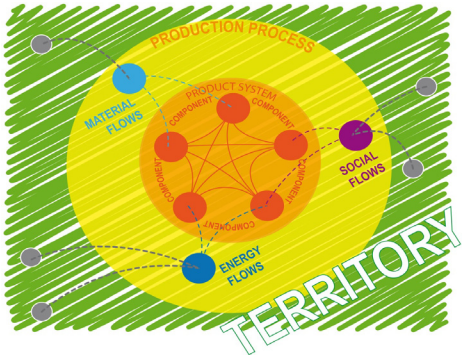

Figure 1 – Energy, material and social flows link together the product system, the production process and the territory

RESEARCH – DIFFERENCES BETWEEN "SUBJECT" AND "USER"

Until today the focus of the project was the "final product"; from now on the focus becomes instead the "human being" and its needs.

In order to design for a "human being" it is important to project not for a "user" but for a "subject", namely the "man". On the dictionary we can read:

- *User[1]: a person or thing that uses something*
- *Subject[2]: the person, mind, ego, or agent of whatever sort that sustains or assumes the form of thought or consciousness.*

Two different meanings take place.

The "user" is someone who uses something, the one who does something often driven by habits. He conforms his choices to those of the majority of people.

The "subject", on the contrary, is aware of his decisions. He consciously manifests the will to take action, he has the critical ability to define how and what to do. He is characterized also by a strong sense of belonging to territory.

Frequently advertising and marketing turn their attention to "users": persons that do actions, following their unconscious behaviours.

As pointed out by Professor Luigi Bistagnino (Design, Politecnico di Torino, Italy), "users" define the "target", described as a large group of people, characterized by a standardization of taste, needs and requirements.

Projecting for a "target" has simplified the design phase, but has also led increasingly to a product devoid of cultural specificity, identical all over the world. This kind of product is detached from its local context; it is possible to define it as a "standard product", sold in a global market, part of an international economy.

The "global economy" takes advantage of users' weakness and leads them to impulse buy of products in order to follow a suggested trend and life style. The vast majority of the people will choose a product not because of its intrinsic features but rather because of its market-based idea and personal belief that it will make them part of a group and elevate their social status.

The designer, basing the project on the mass culture, without links to the local context, cuts the cultural roots of individuals, creating a "globalized product" identical all over the world.

In order to reach a sustainable design, it is important to change the aim of the project: from a general product, to a customised one, founded on real human's needs and territory's resources.

The "subject", through conscious choices, will prefer local products instead of standard ones; so that he will move the market towards a holistic systemic approach, deeply related with the context and its characteristics.

METHODOLOGY

The "old" design process, based on "users" as target and on standard products, might be replaced with a "new" approach, focused on the "subject" and its strong links with the local territory.

According to the Systems Design theory and to the Design by Components methodology, the man and its needs become the centre of the project: this focus point gives a specific identity to the product.

In order to reach this "design-changing", it becomes necessary to design according to people knowledge, respecting their culture, the characteristics of the territory and its resources.

The result of this approach is a new idea of product, which becomes a customised product, and a different concept of the consumer.

The expectation is that "users" will be inspired by this different design-way, becoming "active subjects" and creating positive relationships within their social context and their territory.

According to the systemic thinking, it is possible to say that the essential properties of a living system arise from the interactions and relationships among the parts. Systemic thinking is thinking in terms of relationships. The shift from the parts to the whole requires another shift of focus, from objects to relationships.

Designing for the "subject", with the Systems Design approach, brings to a new scenario, in which the person is autonomous but related with other individuals and with the environment. Systemic thinking is always contextual thinking. [1]

Relationships between elements are fundamental for the balance and the survival of the system: from these links take place reciprocal influences, which change the whole.

Therefore system components are strictly related to each other with bonds based on responsibility and awareness of each element and not on the exceeding of a subject to another. [3]

As pointed out by Fritjof Capra (Ph.D., physicist and systems theorist, http://www.fritjofcapra.net/): "life in the social realm can also be understood in terms of networks. Living networks in human society are networks of communications. Each communication creates thoughts and meaning, which give rise to further communications, and thus the entire network generates itself. As communications continue in a social network, they eventually produce a shared system of beliefs, explanations, and values – a common context of meaning, known as culture, which is continually sustained by further communications. Through this culture individuals acquire identities as members of the social network, and in this way the network generates its own boundaries.

[1] http://www.oxfordadvancedlearnersdictionary.com/dictionary/user
[2] http://www.merriam-webster.com/dictionary/

The social network also produces a shared body of knowledge – including information, ideas, and skills – that shapes the culture's distinctive way of life in addition to its values and beliefs." [1]

Capra's theory is useful to understand the reason because of different territories and Countries – developed or not – are characterized by several different cultures, each defined by its values and meanings: the "man" creates networks of communication, which define specific cultures, depending on the context.

Each territory is also defined by its material resources: gradually the human being defines the ability - namely "know how" - to use this resources in order to solve its needs. Thanks to his "know how", the "man" develops a "material culture", formed by elements of the material realm, closely related to the territory.

These several cultural frameworks define the necessity of a new designing process, based on the project of customised products, which comes from different areas and cultures. This sort of product should be referred to specific resources of the territory, in order to enhance cultural and material peculiarities of any different geographical zone.

Following a customised project approach, designers should restrict their range of project action, in order to provide different solutions to several different subjects (Figure 2).

Figure 2 – Countries are characterized by several different cultures, each defined by its own resources, know-how, material and social culture

According to Design by Component approach, a product is like the union of several interrelated components that perform an action and that is connected with other elements to form a "macro-component". Each macro-component can be part of a more complex system. [2]

Applying this concept to product customization it is possible to imagine an object as the sum of several parts: the main part - the "heart" of the product - and the ancillary changeable ones - as cultural, social and environmental issues.

The "heart" of the product is responsible of the object's functioning; the ancillary components define the context characterization of the product (Figure 3).

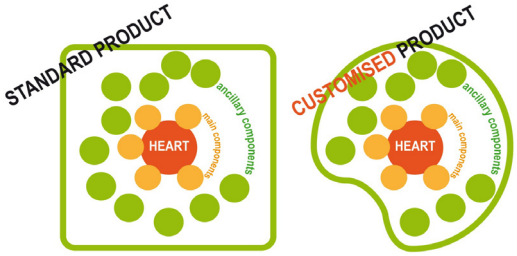

Figure 3 – Differences between standard and customized product. In a product, according to the Design by Components methodology, the shape follows the function.

The application of the Design by Components methodology to the product design generates a new holistic manufacturing model:

- *the main company will control the whole production systems thanks to its know how;*
- *the same company will produce the "heart" of the product;*
- *the "foreign" supplier will be turned in local producer, that means that they will produce the ancillary components, the accessories, or the out shell of the product, according the cultural background and technologies.*

This transformation should underline a flexible and adaptable object, obtained by a production structure model strictly linked to local features and resources. [4]

The Ikea Company applies a similar approach: this Swedish industry of furniture has 1220 suppliers located in 55 different Countries, but gives to its customers a "customized product" specific for each territory.

To give an example the Ikea's products follow Company's design rules, but they are produced in different part of the world (worldwide), in order to use local materials and human's characteristic. Thanks to this production approach, each product is made with local materials, which define a short logistic chain, according to the territory's resources. [5]

CASE STUDY: THE COOKING POINT

Applying the Design by Components methodology to a project of a cooking point, it will be necessary not to design a standard product, but to enhance the subject and its culture.

In order to obtain the necessary knowledge for a successful design, the first step is to know and analyze main dishes of the specific territory.

The analysis of the traditional dishes will bring out further information about local foods and their storage, and also about cooking steps and the necessary tools.

Thanks to these project details, designers understand which are the domestic zones involved during the food preparation, and what kind of relationships are established between different home areas and the subject movements.

Used tools, involved domestic environments and cooking methods of different dishes, will define the project of the cooking point.

The final product will be created according to the subject's needs and the available domestic spaces.

The observation of the local traditions and folklore – especially of the countryside – allows the designer to contextualize his product to the local culture. Traditions will suggest best materials, colours and patterns.

Through Design by Components and Systems Design methodologies, the designer is conscious and expert in a particular culture: the final product will answer to the needs of the subject and will respect the resources of the territory.

In order to better understand the concept of the tailored product, it is useful to analyze the differences between a cooking product developed for two different territories – for example the Arctic Zone and the Eastern Africa Area - defined by different cultures, traditions, climate and so on.

The first one, for the Arctic Zone - should be easy to move, resistant to the freezing temperatures, designed for small domestic spaces and useful for the ground cooking.

The second one – for the Eastern Africa Area – could be defined by bright colours, benches which allows the traditional "sitting cooking", a circular shape of the cooking furniture, in order to favour the sharing cooking moment through components of the family (Figure 4).

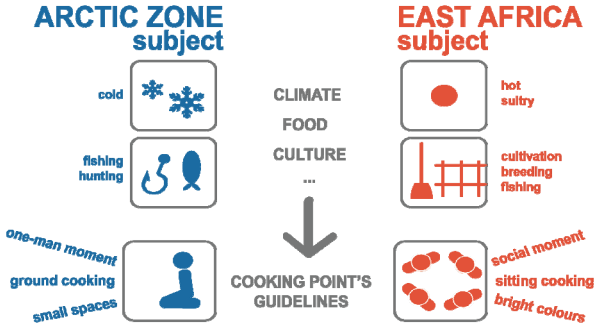

Figure 4 – Cooking point's guidelines for the Arctic Zone and the Eastern Africa Area

CONCLUSIONS

In conclusion, the methodology of Design by Components with a Systems Design approach, applied to a product, outlines:

- *the definition of a "customized product" for each different territory, instead of a "standard product";*
- *the creation of a "subject" - aware of its choices - opposed to a "user" - guided by unconscious behaviour;*
- *the maintenance of a local culture, which is not replaced by the global one;*
- *the origin of a "systemic production model", defined by a strong relationship between product and local resources (Figure 5).*

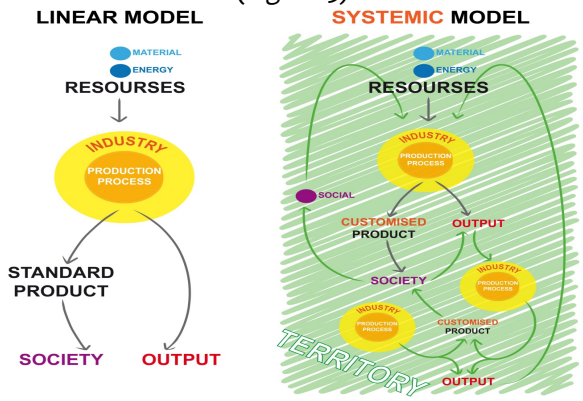

Figure 5 – Linear and systemic production models

This designing approach, based on the surrounding environment, leads to re-evaluate the near and local territory instead of the far and global one.

From this perspective, also the products flows undergo a radical change: the global logistic will be replaced with a limited range logistic. Products will be found locally at lower cost and superior quality.

This scenario reverses the economical globalization, in favour of a local development, which allows the preservation of local, social and material culture.

Strengthening of social bounds should lead to a shift into the industrial approach: from competition between parts – linear model – to cooperation between different stakeholders – systemic model.

It would be desirable a change on the production rules, in favour of systemic strategies deeply integrated with their own territorial, social and economical contexts.

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